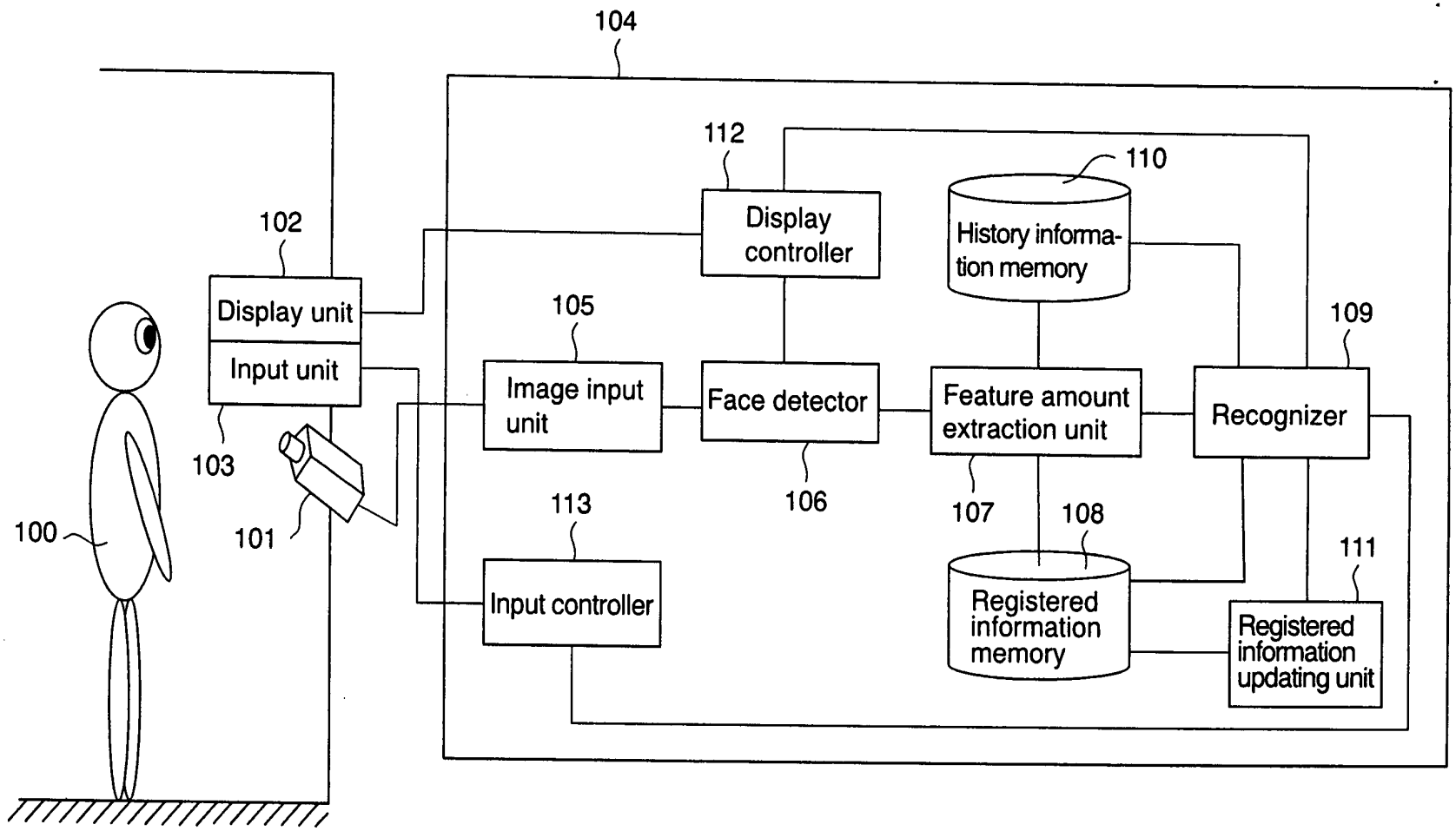
104
112
110
102
Display controller
History information memory
Display unit
105
109
Input unit
Image input unit
Face detector
Feature amount extraction unit
Recognizer
103
106
100
101
107
108
113
111
Input controller
Registered information memory
Registered information updating unit

FIG. 1

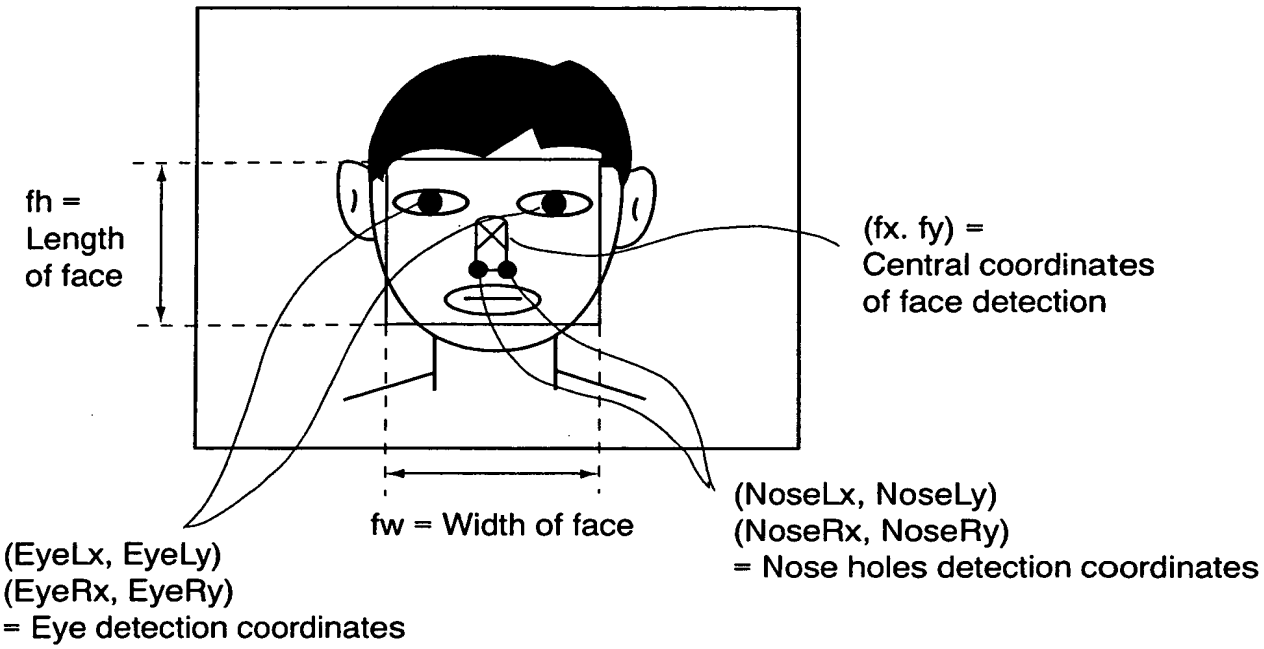
fh =
Length
of face
(fx. fy) =
Central coordinates
of face detection
fw = Width of face
(NoseLx, NoseLy)
(NoseRx, NoseRy)
= Nose holes detection coordinates
(EyeLx, EyeLy)
(EyeRx, EyeRy)
= Eye detection coordinates

FIG. 2

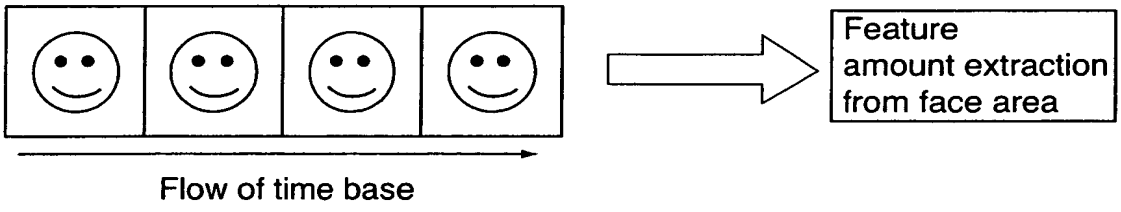
Feature
amount extraction
from face area
Flow of time base

FIG. 3

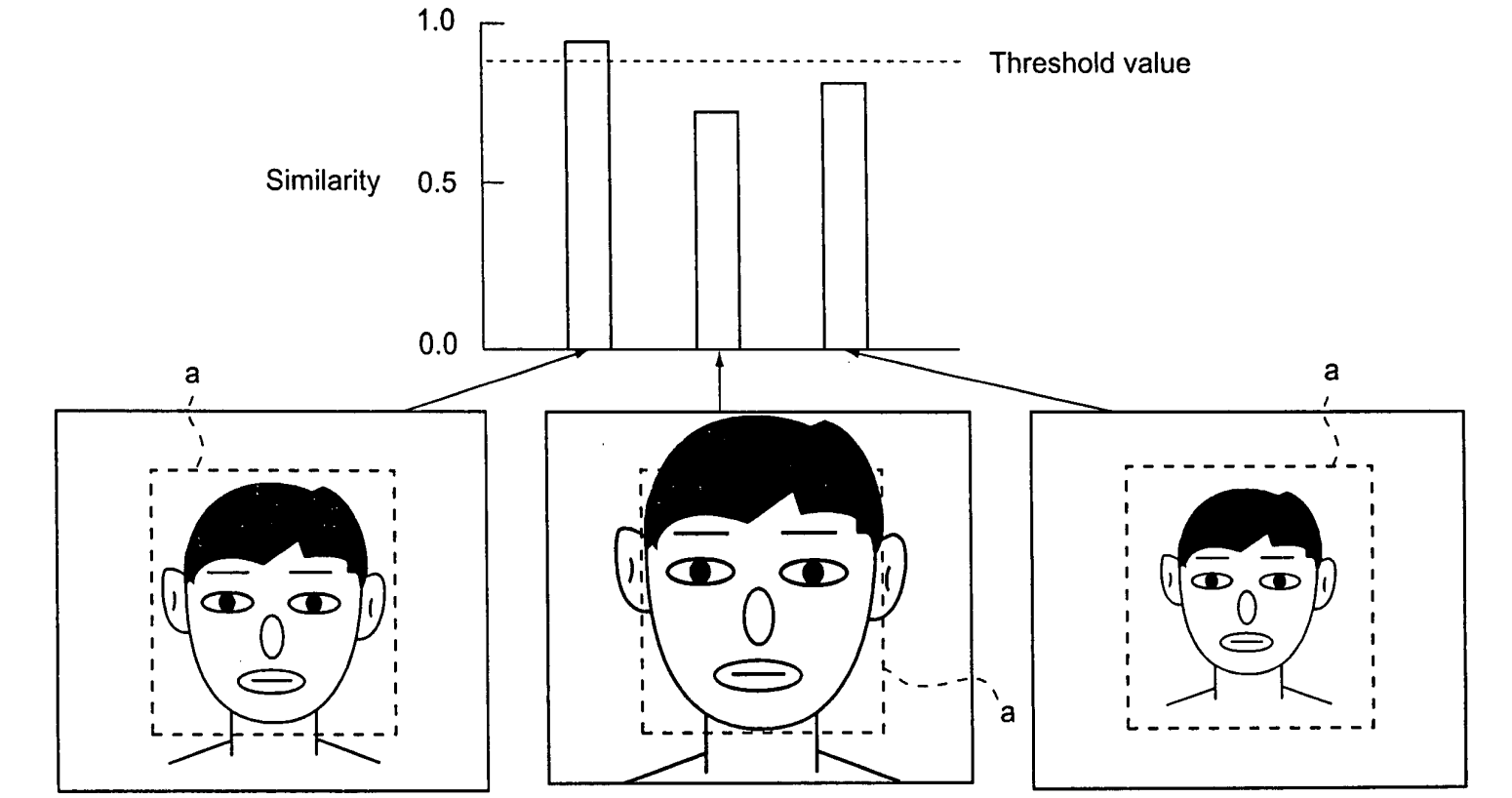

FIG. 4A FIG. 4B FIG. 4C

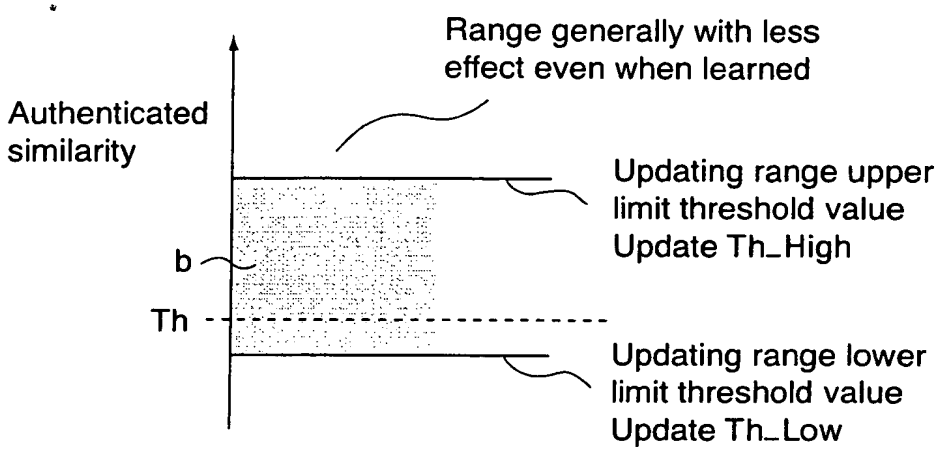
Range generally with less effect even when learned
Authenticated similarity
Updating range upper limit threshold value Update Th_High
b
Th
Updating range lower limit threshold value Update Th_Low

FIG. 5

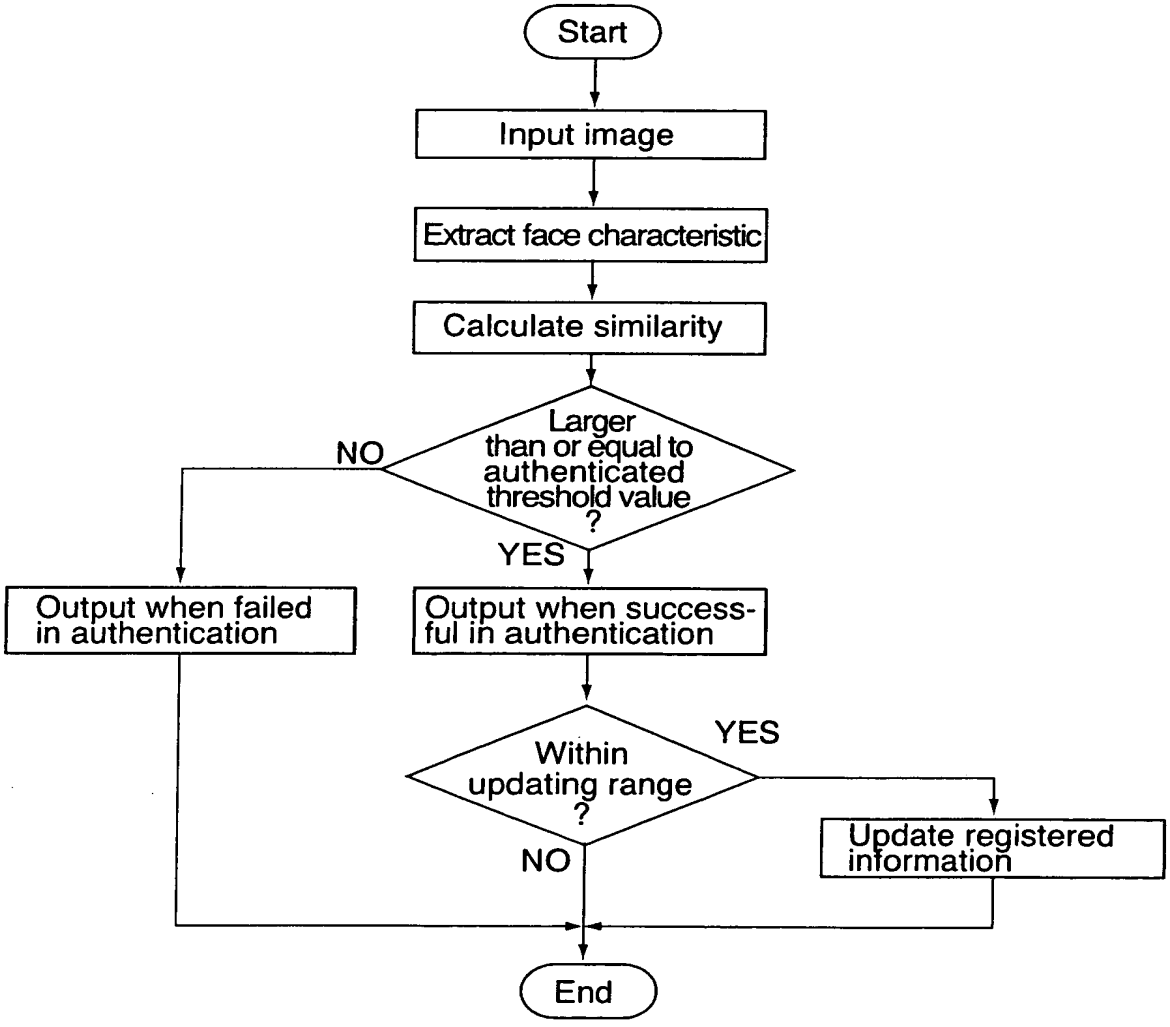
Start
Input image
Extract face characteristic
Calculate similarity
Larger than or equal to authenticated threshold value ?
NO
YES
Output when failed in authentication
Output when successful in authentication
Within updating range ?
YES
NO
Update registered information
End

FIG. 6

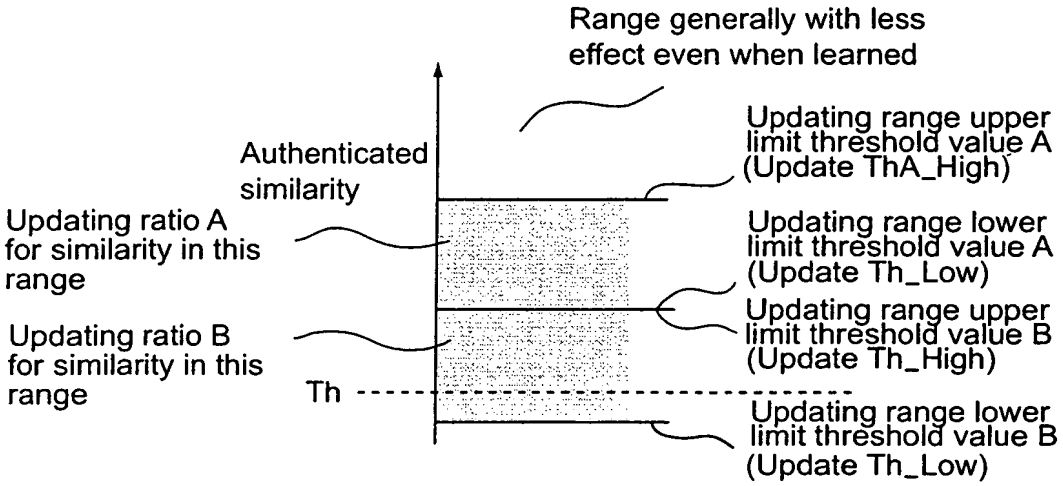
Range generally with less effect even when learned
Updating range upper limit threshold value A (Update ThA_High)
Authenticated similarity
Updating ratio A for similarity in this range
Updating range lower limit threshold value A (Update Th_Low)
Updating range upper limit threshold value B (Update Th_High)
Updating ratio B for similarity in this range
Th
Updating range lower limit threshold value B (Update Th_Low)

FIG. 7

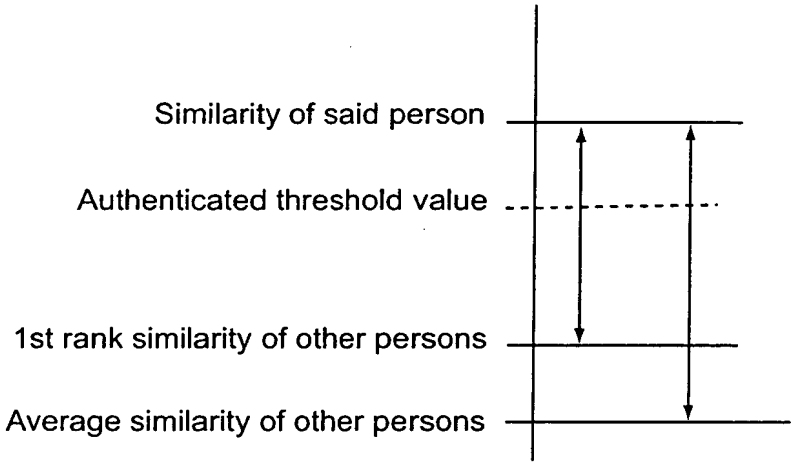
Similarity of said person
Authenticated threshold value
1st rank similarity of other persons
Average similarity of other persons

FIG. 8

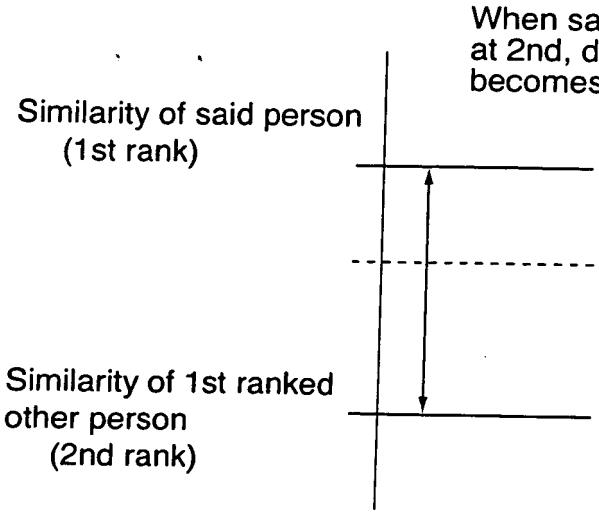

FIG. 9A

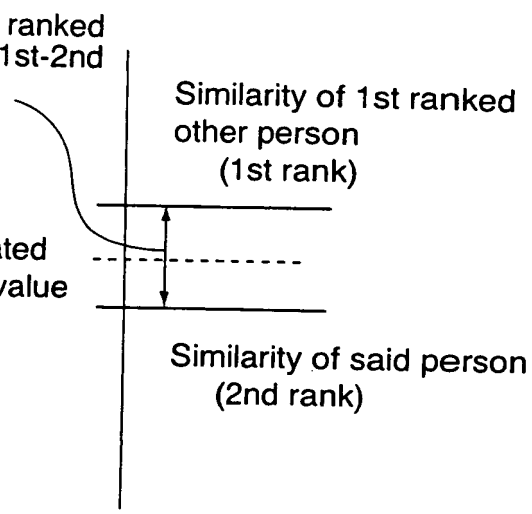

FIG. 9B

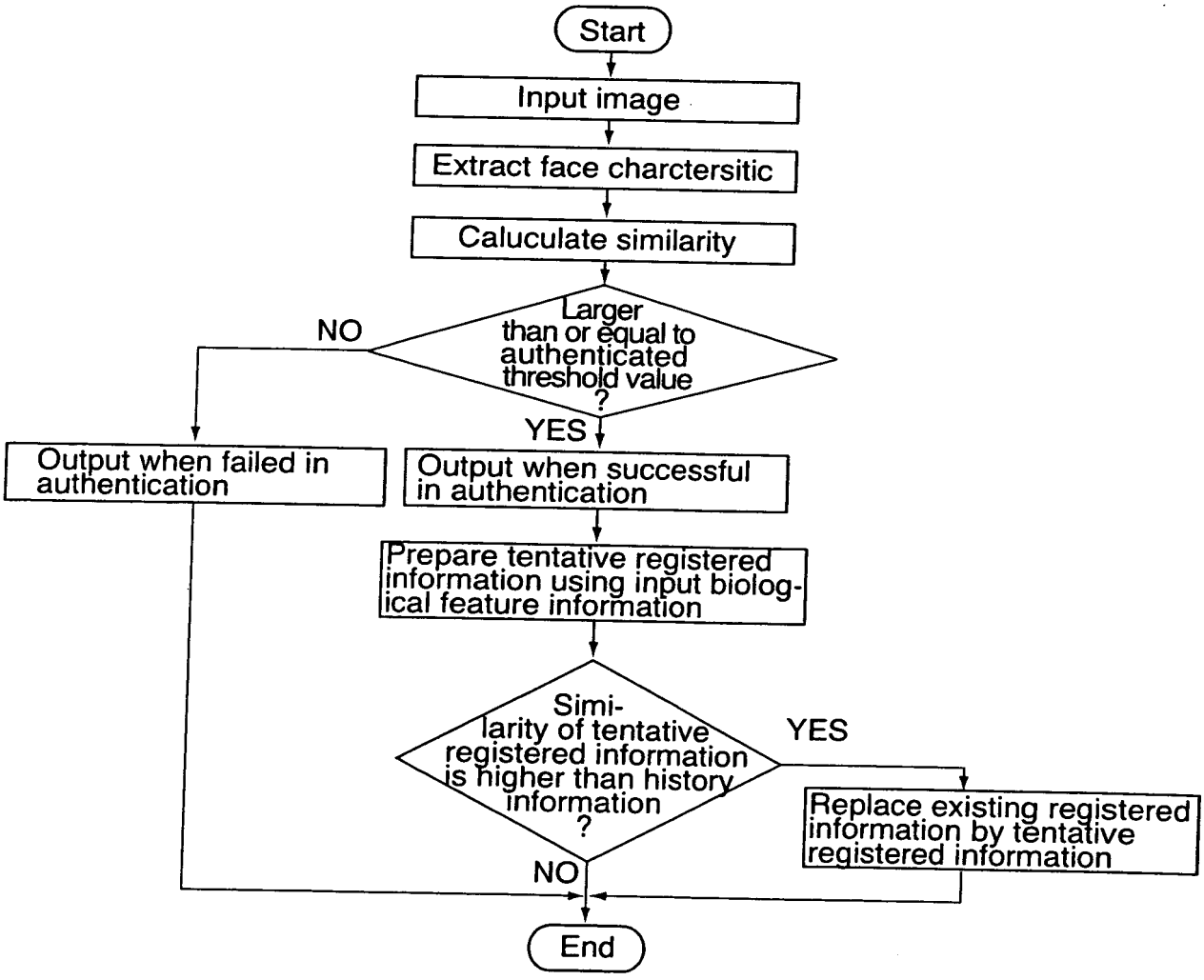

FIG. 10

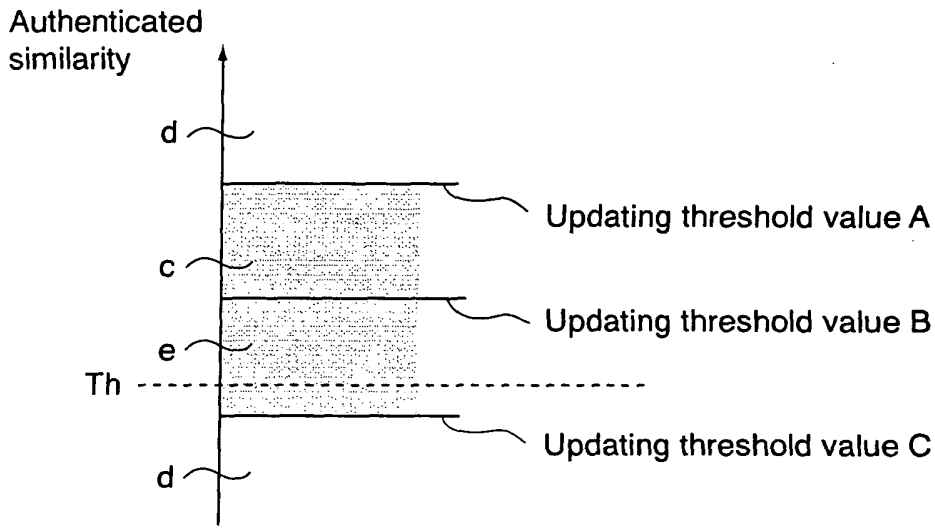
Authenticated similarity
d
c
e
Th
d
Updating threshold value A
Updating threshold value B
Updating threshold value C

FIG. 11

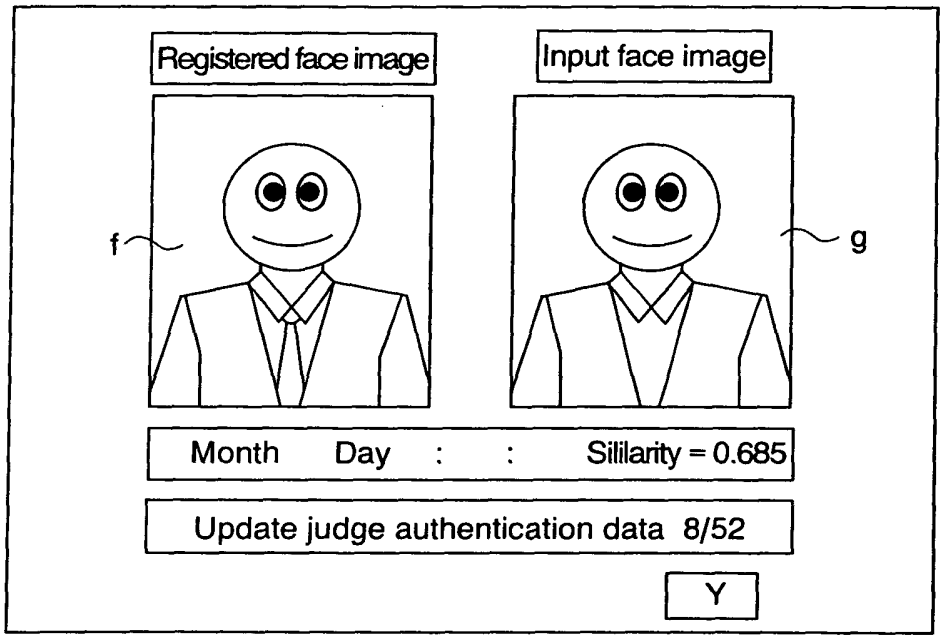
Registered face image
Input face image
f
g
Month Day : : Sililarity = 0.685
Update judge authentication data 8/52
Y

FIG. 12

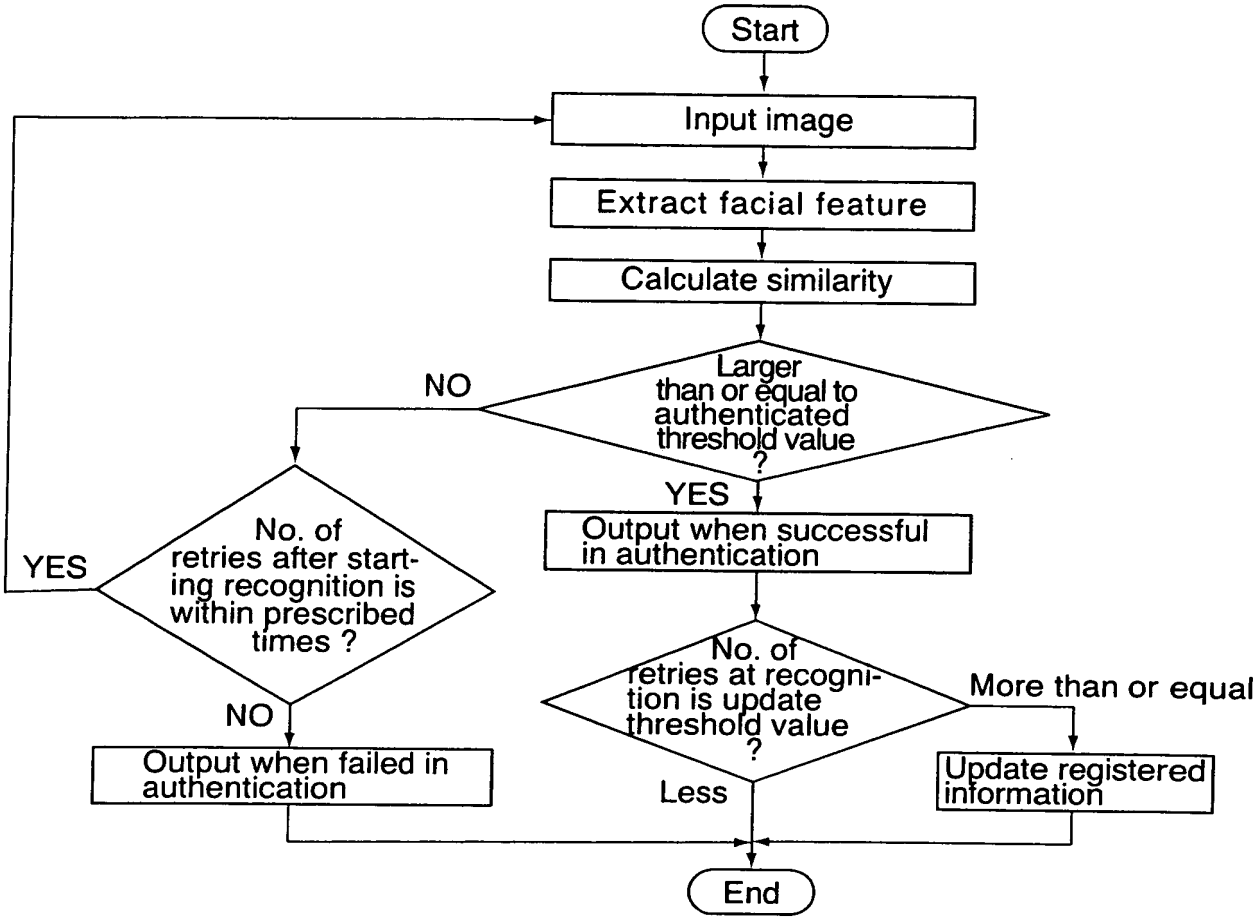
Start
Input image
Extract facial feature
Calculate similarity
Larger than or equal to authenticated threshold value ?
NO
YES
Output when successful in authentication
No. of retries at recognition is update threshold value ?
More than or equal
Less
Update registered information
No. of retries after starting recognition is within prescribed times ?
YES
NO
Output when failed in authentication
End

FIG. 13

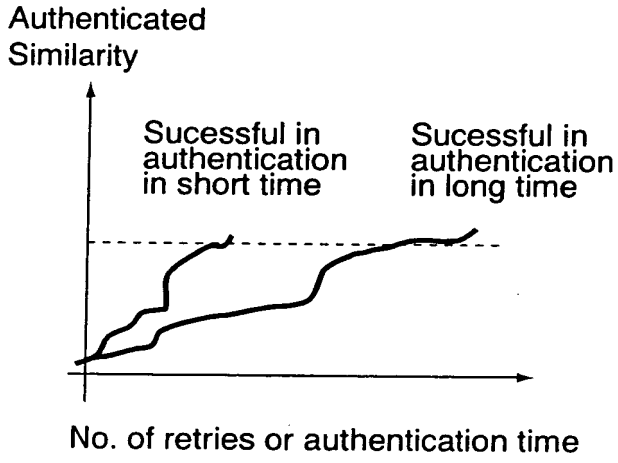
Authenticated Similarity
Sucessful in authentication in short time
Sucessful in authentication in long time
No. of retries or authentication time

FIG. 14

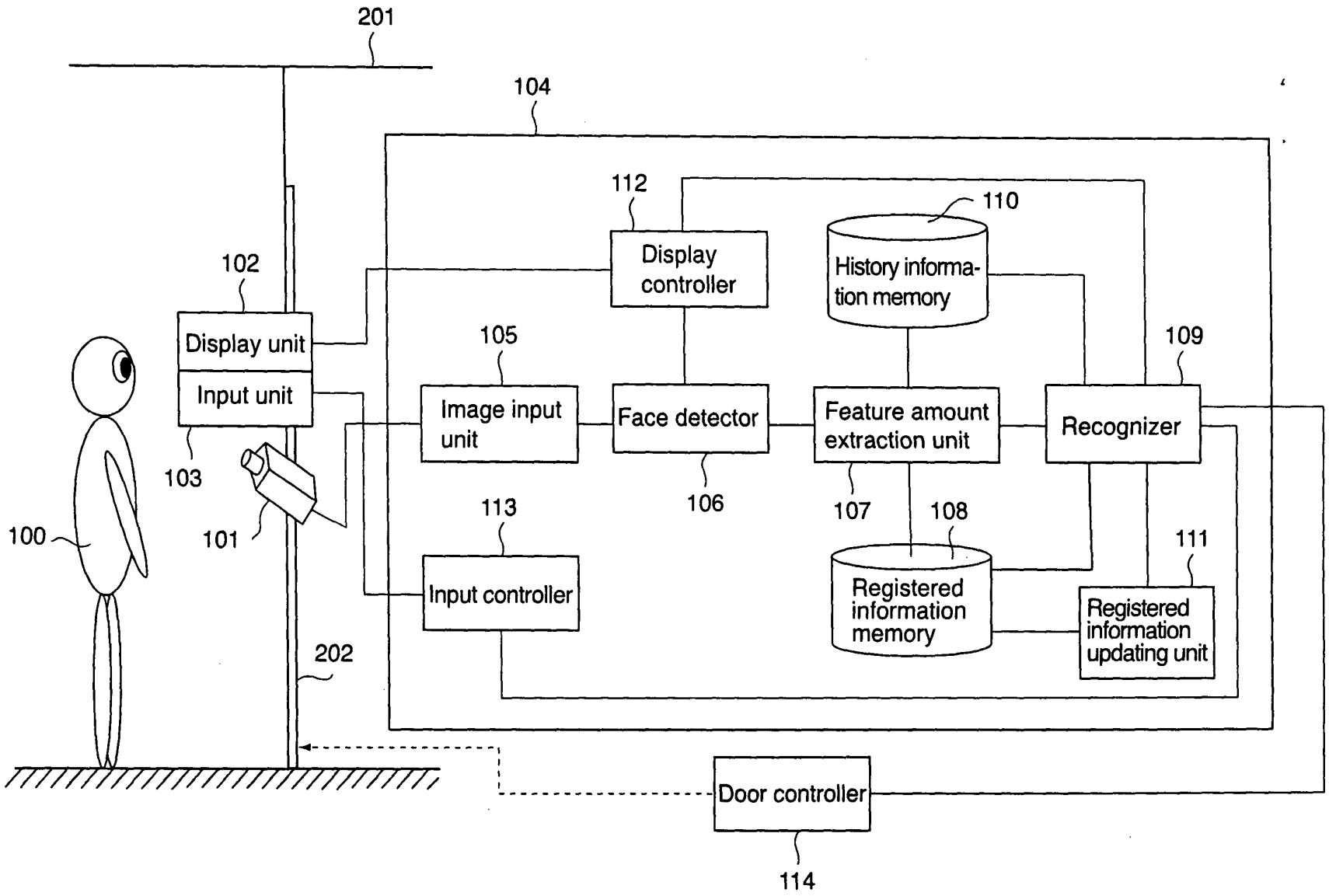
201
104
112
110
Display controller
History information memory
102
Display unit
Input unit
105
109
Image input unit
Face detector
Feature amount extraction unit
Recognizer
103
101
106
107
108
111
100
113
Input controller
Registered information memory
Registered information updating unit
202
Door controller
114

FIG. 15